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RECORD OF REVISIONS

Rev	Date	Description	POC	OIC
0	8/16/04	Initial issue.	Kelly Bingham, <i>FWO-DECS</i>	Gurinder Grewal, <i>FWO-DO</i>

**Responsible Engineering Standards POC and Committee
for upkeep, interpretation, and variance issues**

WPS 3-01	<u>Welding POC/Committee</u>
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WPS 3-01 APPLICATION OF WELDING PROCEDURE SPECIFICATION

1.0 PURPOSE AND SCOPE

- A. The purpose of this procedure is to define the requirements for developing and processing Welding Procedure Specifications (WPS) for use in performance of welding by or for LANL and the SSS or other subcontractors as determined by contract or Purchase Order.
- B. The scope of this procedure is applicable to and in support of all welding processes and applications under the LANL Welding Program.

2.0 REFERENCES

- 1. WTS 4-01, *Application of Welding Technique Sheets*
- 2. GWS 1-04, *Welding Procedure Qualification Tests and Records*
- 3. WPS 3-02, *Welding Procedure Specification Index*

3.0 ACRONYMS AND DEFINITIONS

- A. Welding Procedure Specification (WPS) – a document used to define essential, supplemental-essential, and nonessential process variables for performance of welding and brazing in accordance with applicable codes or standards.
- B. Welding Fabrication Procedure (WFP) – a document developed to specify code, standard, or specification requirements for fit-up, tack welding, preheat, inter-pass, cooling rates, acceptance criteria, weld profiles, weld repair, etc. for welding performed under a qualified WPS. WFPs are qualified sub-sets of WPSs.
- C. Welding Technique Sheet (WTS) – a document developed for a specific job or task which defines extraordinary welding or fabrication requirements and used in conjunction with a WFP. Unless otherwise approved by the LANL WPA, the WTS shall be used only for that job or task identified in the WTS.

NOTE: As used throughout this procedure, reference to Welding Procedure Specifications (WPS) shall include Brazing Procedure Specifications (BPS) as may be applicable.

4.0 GENERAL

4.1 Responsibilities

- A. The LANL Welding Program Administrator (WPA) is responsible for approving Welding Procedure Specifications for welding applications / processes performed by or for LANL.
- B. The LANL Welding Program Administrator (WPA) is responsible for establishing welding criteria and developing the Welding Procedure Specifications (WPS) in accordance with governing codes, standards and LANL engineering specifications.
- C. The LANL PS-1 Institutional Quality Management Group (IQMG) is responsible to perform audits and surveillances to verify that the requirements of this procedure are followed. This includes on-site as well as off-site welding activities.

- D. Each Department Manager is responsible for ensuring that welding performed by their department is conducted in accordance with the applicable WPS. If a WPS is not available for the intended work, the LANL WPA shall be contacted before proceeding with welding.
- E. The assigned LANL or SSS Welding Inspector (CWI or WPA-qualified equivalent) is responsible for monitoring welding performed in accordance with the approved WPS, WFP or WTS. Any noted deviations from the WPS, WFP, or WTS shall be recorded and immediately reported to the LANL or Craft Supervisor for resolution. Deviations to essential variables shall not be permitted until the LANL WPA revises the WPS.
- F. The LANL or Craft Supervisor and the assigned Welder are responsible for the application of, and conformance to, the approved WPS, WFP, or WTS. In cases where the assigned WPS, WFP, or WTS cannot or is not being followed, the LANL or Craft Supervisor shall immediately terminate the welding operation and notifying the Welding Inspector. Violation of essential variables shall be reported to the LANL WPA for resolution.

4.2 Application / Retention

- A. Original Welding Procedure Specifications (WPS) and Welding Fabrication Procedures (WFP) are down-loaded for field use and made available on line at URL <http://www.lanl.gov/f6stds/pubf6stds/engrman/13weld/html/13weld2.htm>. Copies can be printed for field use but must be considered and used as a controlled document. Signature-approved originals are retained on file in the LANL Standards Program office.
- B. Welding Technique Sheets (WTS) are developed individually for specific job or task fabrications. Original signed and dated WTSs are provided to the end user and kept on file as required by the Facility, Project, or Program document control requirements. Copies are retained in LANL Standards Program files (for reference) but are not available on line unless specifically requested. Copies can be down-loaded and printed but shall be used only for the task or job intended and filed or destroyed as defined by the job or task instructions.

4.3 Governing Codes and Standards

- A. The requirements of this procedure apply to Welding Procedure Specifications developed in accordance with the following codes, standards, and specifications.
 - ASME - American Society of Mechanical Engineers
 - AWS - American Welding Society
 - AWWA - American Water Works Association
 - API - American Petroleum Institute
 - ANSI - American National Standards Institute
 - AISC - American Institute of Steel Construction
 - AGA - American Gas Association
 - PFI - Pipe Fabrication Institute
 - LANL – Facility and/or Program Specifications
 - DOT - Department of Transportation
 - LANL Project/Program Engineering Specifications

- B. Whenever possible and permitted by engineering criteria, Welding Procedure Specifications and applicable WFP or WTS shall be developed to permit work to any of the above referenced codes and standards. These codes and standards apply to specific types of fabrication / construction and each may impose additional welding requirements. Users are cautioned that qualification under one code is not a guarantee that the procedure is acceptable for use under another code or standard. Questions regarding the application of a particular WPS, WFP, or WTS should be brought to the attention of the LANL WPA.
- C. All welding shall be performed in accordance with an approved WPS and applicable WFPs for the effective code or standard. Technical exemptions or exceptions invoked by engineering specification or regulatory agencies shall be addressed by a Welding Technique Sheet (WTS) and accompany the WPS or WFP to provide for proper justification and authorization of such exemptions or exceptions. Welding Technique Sheets shall also be required for any welding applications developed for specific LANL or SSS user groups when the application departs from national codes or standards, or is not otherwise covered by this program. See WTS 4.01, *Application of Welding Technique Sheets*.

5.0 PROCEDURE

5.1 General

- A. Welding Procedure Specification (WPS) and corresponding WFP may be requested by any organization needing to perform a welding operation. Written requests (electronic submittals preferred) shall be forwarded to the LANL WPA for processing.
- B. The Welding Program Administrator shall review the request and determine the extent of controls required for the welding operation. When a suitable Welding Procedure Specification is not currently available, the LANL WPA shall develop and qualify a new WPS (WFPs are qualified sub-sets of a WPS) in accordance with GWS 1-04, Welding Procedure Qualification Tests and Records.
- C. Upon completion of the procedure qualification, the LANL WPA will draft a copy of the WPS for review by the requesting department or individual. The Welding Procedure Specification, Attachment 1, shall be developed and electronically filed.
- D. If the control conditions of the WPS satisfy the control requirements of the LANL WPA and distributed in accordance with the next paragraph. The original WPS shall be retained by the LANL WPA and be available in Volume 4 of the LANL Welding Standards Program.
- E. When not posted on the website, controlled copies of WPSs will be reproduced and issued by LANL Standards Program office to the requesting department or individual. Copies are not to be reproduced from controlled copies for any purpose.
- F. A WPS, WFP, or WTS developed and issued for a specific set of conditions on one job shall not be used on another job, with what appears to be the same conditions, unless reviewed by the LANL WPA and re-issued or otherwise approved for the new application.

- G. WPSs and WTSs shall be filed for record purposes by the department or individual, upon completion of welding.

6.0 APPENDIX AND ATTACHMENTS

Appendix A: LANL Welding Procedure Specifications Index

Attachment 1: WPS Development Flow Chart

Attachment 2: WPS Designation Codes and Nomenclature

Attachment 3: Welding Procedure Specification (WPS) Form

Attachment 4: Brazing Procedure Specification (BPS) Form

Attachment 5: API Welding Procedure Specification Form

Attachment 6: AWS Pre-qualified Procedure Specification Form